Appendix C

Utility Reliability Profiles

The System Average Interruption Frequency and Duration Indices, SAIFI and SAIDI, are the primary reliability statistics calculated for the 6560 study. They were calculated by the agencies based on data provided by the utilities. The tables below show each utility's calculated SAIFIs and SAIDIs and describe the inputs used to calculate them. Utilities employ a range of methods for gathering and processing the data used to calculate SAIFI and SAIDI. These differences can be significant and mean the resulting statistics are not truly comparable. The Example Table explains the table contents and the significance of the answers.

Example Table

In this cell a brief description of the utility is provided, with an emphasis on aspects that may have an impact on reliability. For example, utilities East of the Cascades experience less wind and have fewer severe storms than those in the West. Rural utilities may have relatively higher SAIDIs because their distribution lines are often isolated and customers cannot be restored by switching them to a different circuit.									
In this cell are comments about use of the data in the 6560 Study.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI	Data here	Data here	Data here	Data here	Data here	Data here	Data here	Data here	Data here
SAIDI	Data here	Data here	Data here	Data here	Data here	Data here	Data here	Data here	Data here
Utility Confidence in SAIFI	Recognizing that all SAIFI and SAIDI calculations are based on estimates, utilities were asked to estimate how accurate the calculations might be and whether they tend to be high or low. This cell contains those estimates.								
Utility Confidence in SAIDI	Same as Above (SAIFI).								

SAIFI & SAIDI Input Details		
Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only		A yes answer means the calculations are based on sustained interruptions only – those lasting one minute and longer or five minutes and longer – depending on the utility. It is generally agreed that there are few interruptions that last longer than one minute but less than five, therefore the data are presumed comparable.

Includes Momentary Interruptions		A yes answer means the utility is counting momentary interruptions – those that last less than a minute - in addition to sustained interruptions. The effect is generally to greatly increase SAIFI, because there may be many very short interruptions lasting only a second or two, especially in areas that experience lots of lightning strikes. These many momentary interruptions usually do not add up to a long duration time, therefore SAIDI is not greatly increased.
Includes Extraordinary Events		A yes answer means the utility has included interruptions from storms and other extraordinary events in its calculations. Generally, gathering data during storms is not a high priority, as is restoration, and therefore data collected during storms is generally not as accurate as data gathered during normal operations. Including storm-based data in SAIFI and SAIDI diminishes their accuracy. It can also greatly increase SAIFI and SAIDI. Utilities reported storm-caused interruptions that represented from 13% to 50% of total system SAIFI and from 30% to 87% of total system SAIDI. Knowing that utilities have or have not included storm-based data in their calculations does not mean the numbers can be compared, because the utilities likely use different definitions for storms.
Includes Interruptions from Generation, Transmission and Distribution System Events		A yes answer means that no matter what the cause, all interruption events are included in the calculation.
Includes Partial Feeder Outages		A yes answer means that the utility has attempted, through estimate or direct measure, to include all customer interruptions, even if only a few customers were affected. Full feeder outages often can be monitored automatically at a substation. If only part of a feeder loses power, the utility usually must estimate the number of customers affected and the length of outage. Not counting partial feeder outages would likely result in SAIFIs and SAIDIs that were very low.

Includes Step Restoration		As explained in Section 8, Endnote 4, customers often lose power and are restored in incremental steps. Some utilities attempt to track these steps and include the data in their calculations. The more capable the tracking, the more accurate the SAIFI and SAIDI. Other utilities begin the duration count with the first phone call and end the count when the last customer is restored, regardless of who may have been restored along the way. Not starting the count until the first phone call generally leads to a small underestimate of duration. Not ending the count until the last customer is restored can lead to a significant overestimate of duration. The final result is likely an inflated SAIDI.
Includes Estimates of Customer Interruptions		All utilities have some basis for counting customers who are out of power. Few utilities know exactly how many customers there are on a given line, especially for small sub-circuits of their systems. Both SAIFI and SAIDI are affected by the accuracy of customer counts, either upward or downward.
Instituted Data Management Changes During Study Period		Over the study period, many utilities have made significant changes in the way they collect and estimate data used to calculate SAIFI and SAIDI, often due to employment of new technologies or outage tracking software. A yes answer means the utility has made such changes and the statistics may not be comparable from year to year.

Benton County PUD

Eastside, mixed urban and rural, publicly-owned utility. 39,157 customers, 30.4 customers per line-mile.

Benton PUD currently does not statistically track customer interruptions. Therefore it provided no data from which to calculate SAIFI or SAIDI.

	1990	1991	1992	1993	1994	1995	1996	1997	Average
SAIFI									
SAIDI									

Utility Confidence in SAIFI	
Utility Confidence in SAIDI	

SAIFI & SAIDI Input Details

Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only		
Includes Momentary Interruptions		
Includes Extraordinary Events		

Includes Interruptions from Generation, Transmission and Distribution System Events		
Includes Partial Feeder Outages		
Includes Step Restoration		
Includes Estimates of Customer Interruptions		
Instituted Data Management Changes During Study Period		

Benton REA

Eastside, rural, publicly-owned utility. 11,984 customers, 6.0 customers per line-mile.

Data were not included in calculation of state averages. The data provided were presumed to be interruption events rather than the total number of customer interruptions.

	1990	1991	1992	1993	1994	1995	1996	1997	Average
SAIFI	.091	.108	.086	.046	.068	.073	.055	.065	.076
SAIDI	7.10	2.77	2.33	2.43	1.57	1.77	9.71	2.74	3.72
Utility Confidence in SAIFI	Within 10%, overestimate								
Utility Confidence in SAIDI	Within 10%, overestimate								

SAIFI & SAIDI Input Details

Input Options	Use	Utility Specific Issues
Based on Sustained Interruptions only	Yes	Five minutes and longer
Includes Momentary Interruptions	No	
Includes Extraordinary Events	Yes	"…three substation feeders are out of service or when three line crews called out to respond."
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	No	"The duration of the outage is logged beginning with the time the first customer call is recorded. Once the power has been restored or the disturbance resolved, the crew reports the time which is logged in as the time of resolution."
Includes Estimates of Customer Interruptions	Yes	Customer counts are based on accounting records linked to an engineering database. The count is made based on which protective device operated.
Instituted Data Management Changes During Study Period	Yes	Developed accounting / engineering link during last several years. Accuracy has increased. "It would appear that the number of consumer hours of outage have increased over the last few years, when in fact the number of outages have decreased."

Chelan County PUD

Eastside, mixed urban and rural, publicly-owned utility. 37,633 customers, 29.2 customers per line-mile.									
Data were included in calculation of state averages.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI		.31	.51	.44	.39	.42	.57	.20	.41
SAIDI		40.95	71.97	68.97	44.49	82.12	115.71	40.69	66.87
Utility Confidence in SAIFI			Within 5%, underestimate						
Utility Confidence in SAIDI			Within 10%, underestimate						

SAIFI & SAIDI Input Details		
Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	Five minutes and longer
Includes Momentary Interruptions		
Includes Extraordinary Events	Yes	
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Unclear	Insufficient information provided.
Includes Estimates of Customer Interruptions	Yes	Use billing information for customer counts. Insufficient information to assess accuracy of data.
Instituted Data Management Changes During Study Period	No	

Clark County PUD

Westside, mixed urban and rural, publicly-owned utility. 134,400 customers, customer to line density not available.									
Data were not included in the calculation of state averages because they include momentary interruptions.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI	2.43	5.02	2.22	4.60	3.77	4.07	4.86	2.15	3.64
SAIDI	107.26	26.12	55.44	64.51	75.74	680.78	126.55	51.90	152.18
Utility Confidence in SAIFI			Within 10% either way.						
Utility Confidence in SAIDI			Within 10% either way.						

SAIFI & SAIDI Input Details		
Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	No	
Includes Momentary Interruptions	Yes	
Includes Extraordinary Events	Yes	Utility definition: "Event that requires all of the Utility's crews to restore power – lasting at least 12 hours."

Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Unclear	Insufficient information to determine. Duration based on first phone call and "actual restore time."
Includes Estimates of Customer Interruptions	Yes	Few details provided. Customer count based on "transformer KVA installed." Customer / grid link allows calculation of customer counts "to a moderately poor degree of accuracy."
Instituted Data Management Changes During Study Period	No	

Cowlitz County PUD

Westside, mixed urban and rural, publicly-owned utility. 42,700 customers, 22.9 customers per line-mile.

Data were included in the calculation of state averages.

	1990	1991	1992	1993	1994	1995	1996	1997	Average
SAIFI			0.77	1.49	1.26	1.19	3.05	1.87	1.79
SAIDI			116.48	161.21	160.49	147.70	267.30	201.41	196.44

Utility Confidence in SAIFI	Within 10% either way
Utility Confidence in SAIDI	Confidence not estimated, "probably close for annual averages."

SAIFI & SAIDI Details

Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	Five minutes and longer
Includes Momentary Interruptions	No	
Includes Extraordinary Events	Yes	Defines "all significant outages as 'emergencies'"
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Unclear	Some aspects of step restoration not calculated, such as the effects of switching to other feeders. May cause overestimates and an increase in SAIFI & SAIDI. Unclear whether other aspects of step restoration are calculated.
Includes Estimates of Customer Interruptions	Yes	Number of meters served (customers) is an estimate based upon figures developed annually for feeds in a normal configuration. Load growth or system switching may introduce some error into the calculations.
Instituted Data Management Changes During Study Period	Yes	Accuracy has not changed but more detail is available.

Franklin County PUD

Eastside, mixed urban and rural, publicly-owned utility. 17,680 customers, 19.5 customers per line-mile.									
Data were not included in calculation of state averages. The data provided were presumed to be interruption events rather than the total number of customer interruptions.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI			.016	.009	.015	.014	.017	.014	.014
SAIDI			2.94	1.32	2.46	1.92	2.72	2.44	2.30
Utility Confidence in SAIFI			Within 5%, underestimate						
Utility Confidence in SAIDI			Within 5%, overestimate						

SAIFI & SAIDI Input Details

Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	Five minutes and longer
Includes Momentary Interruptions	No	
Includes Extraordinary Events	Yes	"No written definition of extraordinary event"
Includes Interruptions from Generation, Transmission and Distribution System Events	No	"Only Franklin PUD transmission"
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Unclear	Insufficient information.
Includes Estimates of Customer Interruptions	Yes	Insufficient information to understand process. However, "…numbers of customers may not be current" in the software used to estimate customer interruptions.
Instituted Data Management Changes During Study Period	No	

Grant Count PUD #2

Eastside, mixed urban and rural, publicly-owned utility. 38,538 customers, 11.4 customers per line-mile.									
Data were included in the calculation of state averages.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI				1.55	1.24	0.79	1.05	0.83	1.08
SAIDI				152.43	102.33	60.92	85.02	63.73	91.58
Utility Confidence in SAIFI			Estimates within 5% either way.						
Utility Confidence in SAIDI			Estimates within 5% either way.						

SAIFI & SAIDI Input Details

Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	One minute and longer.
Includes Momentary Interruptions	No	
Includes Extraordinary Events	Yes	Utility does not have a definition for extraordinary event.

Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Yes	"Steps and times those steps occurred in restoration are also included."
Includes Estimates of Customer Interruptions	Yes	Utility operates "an AM/FM system that allows accurate customer counts to be made past any device on the system."
Instituted Data Management Changes During Study Period	Yes	Customer data used to be downloaded once a year…now can get accurate up-to-date customer count at time of event.

Grays Harbor County PUD

Westside, mixed urban and rural, publicly-owned utility. 38,680 customers, 27.1 customers per line-mile.

Data were included in the calculation of state averages.

	1990	1991	1992	1993	1994	1995	1996	1997	Average
SAIFI		1.67	2.83	1.73	3.40	2.03	1.38	2.33	1.93
SAIDI		183.60	477.60	581.14	558.80	174.50	160.88	268.40	301.63

Utility Confidence in SAIFI	Estimate within 10% either way.
Utility Confidence in SAIDI	Estimate within 10% either way.

SAIFI & SAIDI Input Details

Input Options	Use	Utility Specific Issues
Based on Sustained Interruptions only	Yes	One minute and longer.
Includes Momentary Interruptions	No	
Includes Extraordinary Events	Yes	Utility defines as "a major storm or weather condition requiring multiple crews over an extended period of time."
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Unclear	Insufficient information. "…staffs work together to maintain outage logging system."
Includes Estimates of Customer Interruptions	Yes	Insufficient information to access method or accuracy.
Instituted Data Management Changes During Study Period	No	

Inland Power and Light Company

Eastside, rural, publicly-owned utility. 29,133 customers, 4.4 customers per line-mile.									
Data were included in the calculation of state averages. However the data include data from the utility's entire system which include customers in Idaho as well as in Washington.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI	.99	.51	.29	Not Available	Not Available	1.11	1.21	1.43	.73
SAIDI	161.23	105.54	85.83	134.80	115.64	126.77	159.34	194.36	137.85
Utility Confidence in SAIFI	Estimates within 10% either way.								
Utility Confidence in SAIDI	Estimates within 10% either way.								

SAIFI & SAIDI Input Details		
Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	Five minutes and longer
Includes Momentary Interruptions	No	
Includes Extraordinary Events	No	Utility definition: "Major storms that interrupt power to a large number of customers."
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Unclear	Insufficient information provided. "Duration calculations are manually performed by using information from line personnel."
Includes Estimates of Customer Interruptions	Yes	"Customer interruptions are estimated by counting the number of active accounts that are between the pole where an outage begins and the pole where the outage ends." Use billing system information
Instituted Data Management Changes During Study Period	Yes	"Data collection efforts have been refined and improved resulting in an increase in measured outage minutes."

Nespelem Valley Electric Cooperative

Eastside, rural, publicly-owned utility.									
No data provided for calculation of SAIFI and SAIDI.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI									
SAIDI									
Utility Confidence in SAIFI									
Utility Confidence in SAIDI									

SAIFI & SAIDI Input Details		
Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only		
Includes Momentary Interruptions		

Includes Extraordinary Events		
Includes Interruptions from Generation, Transmission and Distribution System Events		
Includes Partial Feeder Outages		
Includes Step Restoration		
Includes Estimates of Customer Interruptions		
Instituted Data Management Changes During Study Period		

Orcas Power and Light Company

Westside (San Juan Islands), primarily rural, publicly-owned utility. 10,605 customers, 11.4 customers per line-mile.

Data were not included in the calculation of state averages. Annual customer data were not provided. The data provided also were presumed to be interruption events rather than the total number of customer interruptions.

	1990	1991	1992	1993	1994	1995	1996	1997	Average
SAIFI								.14	
SAIDI								1194.82	

Utility Confidence in SAIFI	
Utility Confidence in SAIDI	

SAIFI & SAIDI Input Details

Input Options	Use	Utility Specific Issues
Based on Sustained Interruptions only	Unclear	Insufficient information
Includes Momentary Interruptions	Unclear	Insufficient information
Includes Extraordinary Events	Yes	Defined as "When over 25% of our customers are out of power, or we have lost power to a business center."
Includes Interruptions from Generation, Transmission and Distribution System Events	No	Distribution only
Includes Partial Feeder Outages	No	
Includes Step Restoration	No	Because only full feeder outages are tracked, the only restoration tracked is that of the full feeder.
Includes Estimates of Customer Interruptions	Unclear	Only full feeder outages are tracked. If customer numbers are accurate by feeder there is no need to estimate them. They may still be estimated however.
Instituted Data Management Changes During Study Period	No Answer	

PacifiCorp

Eastside, mixed urban and rural, investor-owned utility. 110,956 customers, 27.7 customers per line-mile.									
Data were included in the calculation of state averages.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI	1.17	0.97	0.69	1.32	1.06	0.88	0.57	0.81	0.93
SAIDI	73.65	65.29	68.03	82.92	69.87	71.20	53.06	63.19	68.28
Utility Confidence in SAIFI			Possibility for error greater than 25% either way						
Utility Confidence in SAIDI			Possibility for error greater than 25% either way						

SAIFI & SAIDI Input Details		
Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	One minute and longer
Includes Momentary Interruptions	No	
Includes Extraordinary Events	No	A major event means an event that: Exceeds the design limits of the electrical power system; Causes extensive damage to the electric power system; and Results in a simultaneous sustained interruption to more than 10 percent of the customer in an operating area.
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Unclear	Insufficient information to understand process and methodology.
Includes Estimates of Customer Interruptions	Yes	Insufficient information to understand process and methodology.
Instituted Data Management Changes During Study Period	No	

Parkland Power and Light Company

Westside, urban, publicly-owned utility. 3720 customers, 52.4 customers per line-mile.									
Data were not included in the calculation of state averages. Customer count is so small it would have had little affect on the averages, but the statistics are very low and would have extended the range significantly.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI							.058	.054	.056
SAIDI							13.91	6.54	10.13
Utility Confidence in SAIFI			Within 5% either way						
Utility Confidence in SAIDI			Within 5% either way						

SAIFI & SAIDI Input Details		
Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	One minute and longer

Includes Momentary Interruptions	No	"No known outages less than one minute."
Includes Extraordinary Events	No	Defined as "Event that impacts a widespread area of service."
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Unclear	
Includes Estimates of Customer Interruptions	Yes	"Outages occur so infrequently and system small enough that no data is recorded except on time sheets."
Instituted Data Management Changes During Study Period	No	

Puget Sound Energy

Westside, mixed urban and rural, investor-owned utility. 872,410 customers, 48 customers per line-mile.

Data were included in calculation of state averages.

	1990	1991	1992	1993	1994	1995	1996	1997	Average
SAIFI	2.15	1.05	1.33	1.07	1.10	1.60	1.26	1.04	1.31
SAIDI	215.98	95.31	101.56	93.03	120.22	183.66	139.63	104.65	131.28
Utility Confidence in SAIFI			"No idea"						
Utility Confidence in SAIDI			"No idea"						

SAIFI & SAIDI Input Details

Input Options	Use	Utility Specific Issues
Based on Sustained Interruptions only	Yes	One minute and longer.
Includes Momentary Interruptions	No	
Includes Extraordinary Events	No	Defined as "Any natural caused event that causes five percent or more of our customers to lose electrical service during any day. Natural causes include weather, earthquake, fire, flood, land slides, volcanic eruptions or solar flares."
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	Including transmission with operating voltages up to and including 500 kV.
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Yes	Insufficient information to understand process. Claims to track incremental loss and restoration "to a great degree of accuracy."
Includes Estimates of Customer Interruptions	Yes	Insufficient information to understand process and methodology

Instituted Data Management Changes During Study Period	Yes	Over past three years have established a link between a "System Operations" software package and a "Service Restoration System" software package. The link has increased accuracy of calculations and the utility has experienced an increase of from 5% to 20% in recorded outages.

Seattle City Light

Westside, urban, publicly-owned utility. 363,968 customers, 199.4 customers per line-mile.									
Data were included in the calculation of state averages.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI				NA	.78	.52	.88	1.24	.69
SAIDI				56.95	51.63	40.41	37.34	72.68	51.86
Utility Confidence in SAIFI			Within 5% either way						
Utility Confidence in SAIDI			Within 5%, underestimates						

SAIFI & SAIDI Input Details

Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	One minute and longer
Includes Momentary Interruptions	No	
Includes Extraordinary Events	No	Defined as "Over 10% of our customers are affected by the storm or event; a regional or wide-area impact event is the cause; outages are prolonged due to extensive damage to the power system.
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	Last transmission outage was in 1994.
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Yes	Tracks all aspects of step restoration including switching down to the transformer level.
Includes Estimates of Customer Interruptions	Yes	Customer numbers are based on a GIS and Customer Information System that links services (customers) to transformers.
Instituted Data Management Changes During Study Period	Yes	Logging system changed from manual to database in May, 1997. Now tracking smaller outages that were not tracked previously.

Snohomish County PUD No. 1

Westside, mixed urban and rural, publicly-owned utility. 238,365 customers, 48.8 customers per line-mile.									
Data were included in the calculation of state averages.									
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**Average**
SAIFI	1.61	1.20	1.13	1.19	1.02	1.10	.82	.73	1.09
SAIDI	190.19	96.12	101.37	97.23	101.69	94.50	60.33	50.49	97.29

Utility Confidence in SAIFI	Within 25% either way	
Utility Confidence in SAIDI	Within 25% either way	
SAIFI & SAIDI Input Details		
Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	One minute and longer
Includes Momentary Interruptions	No	
Includes Extraordinary Events	Yes	Defined as "An event when all available and qualified District personnel are working during the declared major emergency (i.e. wind and snow/ice storms, natural catastrophic disaster) or when it becomes apparent to the Energy Control Superintendent that outage work exceeds the ability of the available District crews to restore the electric system in a short period of time. A major emergency may be declared when an unusual non-storm event of significant magnitude has occurred which can/does negatively affect a large number o f customers and/or requires intensive and extended work effort by a group of employees.
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Unclear	"The time of the first customer phone call becomes the outage beginning time. The ending time is when field personnel report that service has been restored.
Includes Estimates of Customer Interruptions	Yes	Insufficient information to understand process and methodology
Instituted Data Management Changes During Study Period	No	

Tacoma Power

Westside, urban, publicly-owned utility. 140,000 customers, 83.9 customers per line-mile.

Data were included in the calculation of state averages.

	1990	1991	1992	1993	1994	1995	1996	1997	Average
SAIFI	2.75	1.81	1.75	2.05	1.52	1.83	1.46	1.25	1.80
SAIDI	156.69	147.40	66.37	257.96	75.02	134.26	76.94	75.61	123.01

Utility Confidence in SAIFI	Within 10%, overestimates	
Utility Confidence in SAIDI	Within 5%, overestimates	
SAIFI & SAIDI Input Details		
Input Options	**Use**	**Utility Specific Issues**
Based on Sustained Interruptions only	Yes	
Includes Momentary Interruptions	No	
Includes Extraordinary Events	No	Defined as "When three or more distribution feeders are open due to a single event (i.e. windstorm, snowstorm, etc.)

Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	Yes	
Includes Step Restoration	Yes	"…time is logged as switching actions are completed."
Includes Estimates of Customer Interruptions	Yes	"Number of customers affected are determined by meter count or estimated by the area or section of the feeder compared to the total number of customer meters on each feeder."
Instituted Data Management Changes During Study Period	No	

Washington Water Power

Eastside, mixed urban and rural, investor-owned utility.

The utility does not generally track interruption data statistically. The data provided were estimated for an industry study. Data were not included in the calculation of state averages because they include momentaries.

	1990	1991	1992	1993	1994	1995	1996	1997	Average
SAIFI				8.30					
SAIDI				80.78					

Utility Confidence in SAIFI	30% to 50% underestimate
Utility Confidence in SAIDI	Possible error greater than 50%, underestimate

SAIFI & SAIDI Input Details

Input Options	Use	Utility Specific Issues
Based on Sustained Interruptions only	No	
Includes Momentary Interruptions	Yes	
Includes Extraordinary Events	Yes	Utility has no formal definition
Includes Interruptions from Generation, Transmission and Distribution System Events	Yes	
Includes Partial Feeder Outages	No	
Includes Step Restoration	No	
Includes Estimates of Customer Interruptions	Yes	"Operations technician summarized 1993 outages based on an estimated number of customers per feeder."
Instituted Data Management Changes During Study Period	No	